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National Priority Chemicals Trends Report (2004-2006)

Section 2 Progress Toward OSW's Reduction Goal for Priority Chemicals

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SECTION 2

PROGRESS TOWARD OSW'S REDUCTION GOAL FOR PRIORITY CHEMICALS

OSW's Goal to Reduce Priority Chemicals in Wastes

The Government Performance and Results Act (GPRA) of 1993 requires all federal agencies to publish five-year strategic plans and update them every three years with new goals. The agency's most recent five-year plan encompasses fiscal years (FY) 2007–2011. As this Report goes to press, EPA is about to issue a new strategic plan. Our 2007 Report will take into account that plan and its new goal.

Our current five year GPRA goal is: *By 2011, reduce 4 million pounds of priority chemicals from waste streams as measured by National Partnership for Environmental Priorities (NPEP) contributions, Supplemental Environmental Projects (SEPs), and other tools used by EPA to achieve priority chemical reductions.*

In the past, one of the primary purposes of this Report was to track progress toward achieving this GPRA goal based solely on TRI data. We now rely on actual reduction achievements reported by the NPEP partners to us in measuring progress toward the goal, rather than TRI data, for a number of reasons: 1) TRI data were not released in time for annual performance reporting, 2) not all PCs are reported to TRI, and 3) TRI data are heavily influenced by economic conditions that affect industrial output and waste generation, which makes changes in PC quantities reported to TRI only loosely related to EPA's efforts. For these reasons, we no longer use TRI data to track progress toward achieving our GPRA goals.

Chemical reductions achieved under the NPEP program cannot be easily compared to the quantities reported to TRI for the following reasons:

- NPEP partners typically report their achievements after fully completing their goal, which may span several years. TRI requires annual reporting. Thus, NPEP reductions cannot always be linked to annual TRI data.
- Not all NPEP partners report to TRI. A facility must only report to TRI if it meets specified reporting criteria (e.g., is in a designated industry) and thresholds (e.g., quantity of the chemical, number of employees). Therefore, for a given chemical, a facility might not be required to report to TRI each year.
- TRI only requires reporting on chemical releases and management, not chemical use. Many NPEP partners reduce the use of chemicals in their processes and products which would not be reported to TRI.
- For each chemical reported to TRI, the chemical quantity is aggregated for the entire facility. As such, especially if a chemical has numerous sources within the facility, it is not feasible to distinguish specific process(es) from which the chemical was generated or specific waste streams containing the chemical. In effect, the aggregated quantity masks the NPEP quantity.

For these reasons, we no longer use TRI data for comparing chemical quantities reported to TRI with achievements by NPEP partner facilities. We use TRI data in this Report to show PC trends that can help the Agency and its partners to better focus their waste minimization efforts.

The OSW 2011 GPRA Goal: Priority Chemical Reduction Progress under NPEP

Through FY 2007, NPEP partners have reduced more than three million pounds of PCs. Exhibit 2.1 shows the reductions for each PC that NPEP partners have achieved from FY 2004 to FY 2007.

Exhibit 2.1. NPEP Priority Chemical Reduction Achievements through FY 2007*

Priority Chemical	Reductions Achieved (pounds)				Total Reductions Achieved (pounds) FY 2004–2007	Percent of Total Reductions Achieved FY 2004–2007
	FY 2004	FY 2005	FY 2006	FY 2007		
Lead and lead compounds	49,527	822,564	1,249,699	546,766	2,668,556	74.1%
Naphthalene	0	103,746	0	528,607	632,353	17.5%
Polycyclic aromatic compounds	0	9,318	0	219,529	228,847	6.4%
Mercury and mercury compounds	0	4,346	26,750	9,603	40,699	1.1%
Dibenzofuran	0	0	0	23,830	23,830	0.7%
Polychlorinated biphenyls	0	0	4,335	4,600	8,935	0.2%
Dioxin and dioxin-like compounds	0	0	144	0	144	0.0%
Total	49,527	939,974	1,280,928	1,332,935	3,603,364	100.0%

*These are the most current numbers according to the NPEP Program as of October 1, 2008.

NPEP partner facilities also have standing commitments to reduce over 35 million pounds of 18 PCs by 2011 (Exhibit 2.2). Please see <http://www.epa.gov/epaoswer/hazwaste/minimize/npep/status.htm> for further details about targeted chemical reduction commitments and achievements by NPEP partners.

Exhibit 2.2. NPEP Priority Chemical Reduction Commitments through FY 2011*

Priority Chemical	Reduction Commitments (pounds)				Total Reduction Commitments (pounds) FY 2008–2011	Percent of Total Reduction Commitments FY 2008–2011
	FY 2008	FY 2009	FY 2010	FY 2011		
Lead and lead compounds	3,852,416	1,781,811	4,001	23,493,000	29,131,228	81.8%
Naphthalene	2,808,438	43,985	17,339	0	2,869,762	8.1%
Polychlorinated biphenyls	3,504	2,100,986	4,253	0	2,108,743	5.9%
Polycyclic aromatic compounds	1,287,535	0	2,070	0	1,289,605	3.6%
Dibenzofuran	151,474	0	0	0	151,474	0.4%
Cadmium and cadmium compounds	24,907	2,745	0	38	27,690	0.1%
Mercury and mercury compounds	15,610	315	6,472	0	22,397	0.1%
Trifluralin	1,650	0	0	0	1,650	0.0%
Phenanthrene	1,236	0	0	0	1,236	0.0%
Pyrene	1,038	0	0	0	1,038	0.0%
Pendimethalin	761	0	0	0	761	0.0%
Hexachlorobenzene	0	576	0	0	576	0.0%
Fluorene	249	0	0	0	249	0.0%
Pentachlorobenzene	0	222	0	0	222	0.0%
Benzo(g,h,i)perylene	200	0	0	0	200	0.0%
Acenaphthene	180	0	0	0	180	0.0%
Anthracene	144	0	0	0	144	0.0%
Dioxin and dioxin-like compounds	0	22	0	0	22	0.0%
Total	8,149,342	3,930,662	34,135	23,493,038	35,607,177	100.0%

*These are the most current numbers according to the NPEP Program as of October 1, 2008.

OSW's Activities to Reduce Mercury

OSW has several ongoing projects to reduce mercury. Since December 31, 2005, two of these projects have resulted in a reduction of over 40,000 pounds of mercury to date:

- The Mercury Challenge
- The Mercury In Schools Project

Mercury Challenge

Mercury is a highly toxic chemical that is widely present in the environment, as well as industrial facilities. The National Partnership for Environmental Priorities (NPEP) is working with industry to reduce and phase mercury out of their products and processes. As an added component to these partnerships, companies are encouraged to take the Mercury Challenge, which requires them to:

1) Take the Mercury Challenge Pledge to:

- Identify mercury in their facilities and in the products they make.
- Replace mercury-containing equipment with non-mercury alternatives.
- Dispose of mercury-containing equipment safely.
- Establish mercury-free purchasing policies.
- Inform and educate staff, suppliers, and clients about mercury issues and non-mercury alternatives, and,

2) Implement a Mercury Reduction Plan to identify action items and timelines and help companies to measure progress towards their goals.

By eliminating mercury from their facilities, partners can reduce potential worker exposure and minimize the risk and cost of mercury spills and their subsequent cleanups, as well as save facilities the cost of disposing mercury-containing wastes. Many current uses of mercury in products have cost effective, mercury-free alternatives. EPA also encourages mercury-containing product take-back and recycling programs.

As of June 2008, approximately 20 NPEP partners within the NPEP program have committed to reduce more than 58,000 pounds of mercury by 2011. Currently, over 43,000 pounds of mercury has been successfully eliminated. We are continuing to recruit new facilities and encourage existing partners to identify additional ways to reduce mercury.

Schools Chemical Cleanout Campaign (SC3)

The Schools Chemical Cleanout Campaign (SC3) is designed to achieve three goals: (1) remove unneeded, inappropriate and hazardous chemicals from Kindergarten–grade 12 schools; (2) prevent future incidents through responsible chemical management, which includes using best management practices and finding long-term solutions; and (3) raise national awareness of the problem.

SC3 aims to ensure that all schools are free from hazards associated with chemicals, including toxic mercury, from science, art and vocational classes, as well as chemicals used to maintain and clean the school. To do this, SC3 is building a network of partners to lend their expertise and provide resources to schools. The network includes other healthy schools programs within the Agency; other federal agencies such as the Department of Education; the chemical manufacturing industry; science associations; teachers associations; universities; hazardous waste treatment, storage and disposal facilities; community emergency responders and others who care about the well-being of children.

For example, the New York Department of Environmental Conservation (NYSDEC) program to remove mercury from K–12 schools is one of many programs that demonstrate the results that can be achieved by addressing this issue. The NYSDEC program encourages schools to build a team, develop a plan, get support of the administration, provide training, and work with a mercury recycler. As of August 2007, the NYSDEC Mercury Cleanout program has removed approximately 1000 lbs of mercury from New York State schools (including mercury-containing devices, as well as elemental and mercury compounds). Out of the 1000 lbs, NYSDEC was directly responsible for removing 601 lbs of mercury from 48 schools in the Rochester City and Albany County school districts. NYSDEC conducted 20 workshops, statewide, covering 58 out of the 62 New York State counties from the time period 11/05 thru 5/07. In addition, at the invitation of EPA, a program expert traveled to Thailand to give a presentation to teachers and students from Thailand, Vietnam, Cambodia, and the Philippines at the Mercury in Our World conference, held in Bangkok, Thailand.

Other OSW Efforts to Reduce Mercury

Mercury Public Service Announcement (PSA)

The PSA was developed in response to several highly publicized, expensive mercury spill cleanups in schools. OSW staff partnered with the Minnesota Pollution Control Agency and Clancy, the only U.S. dog trained to sniff out mercury. In the PSA, Clancy identifies sources of elemental mercury in order to educate people about the dangers of mercury, and to highlight the need for the proper handling and disposal of mercury.

The mercury video featuring Clancy was released in the fall of 2007 and is designed primarily to:

- Increase awareness among school children and their parents of the dangers of mercury and
- Educate persons regarding the need for the proper handling and disposal of mercury and mercury-containing products. For more information, please visit our website at <http://www.epa.gov/epawaste/hazard/tsd/mercury/videos.htm#paws>.

Universal Waste Rule: Mercury-Containing Equipment

EPA has added mercury containing devices, e.g., thermometers and switches, to the Universal Waste Rule. For widely-generated hazardous wastes, this rule facilitates entry into the hazardous waste management system, encourages recycling and keeps wastes out of the municipal waste stream.

Mercury Lamps

OSW administered a two million dollar lamp recycling outreach program to promote the recycling of mercury-containing lamps. This effort was supported through ten cooperative agreements with state and non-profit organizations that used these funds to create lamp recycling outreach programs targeting commercial and industrial users of mercury-containing lamps.

The goal of this program was to take a proactive role in increasing the national recycling rate which is currently approximately 24%. To support this effort, OSW:

- Coordinated a Recyclers' Partnership Meeting (February 22, 2006)
- Revamped OSW's Mercury Lamp Recycling Web site;
- Finalized a Mercury Lamp Recycling Fact Sheet;
- Conducted direct outreach to specific target audiences, i.e., large chain stores, commercial property managers, and others; and
- Served as a clearinghouse for outreach ideas and information. (www.epa.gov/bulbrecycling)

Mercury Lamp Recycling

Compact fluorescent lamps (CFLs) contain a very small amount of mercury sealed within the glass tubing—an average of 4 milligrams. By comparison, older thermometers contain about 500 milligrams of mercury. It would take about 125 CFLs to equal that amount. Because CFLs are made of glass and can break if dropped or roughly handled, care needs to be taken in removing the bulb from its packaging, installing it, or replacing it. Basic information on mercury-containing lamps can be found at: <http://www.epa.gov/epaoswer/hazwaste/id/univwast/lamps/basic.htm>.

Mercury is an essential component of CFLs and is what allows the bulb to be an efficient light source. No mercury is released when the bulbs are intact or in use. Mercury may be released into the environment if the CFL breaks during use, transportation to a landfill or placement into the landfill.

Most makers of light bulbs have reduced mercury in their fluorescent lighting products. Thanks to technology advances and a commitment from members of the National Electrical Manufacturers Association, the average mercury content in CFLs has dropped at least 20 percent in the past year. Some manufacturers have even made further reductions, dropping mercury content to 1.4–2.5 milligrams per light bulb.

Switching from traditional light bulbs (called incandescent) to CFLs is an effective, simple change everyone in America can make right now. Making this change will help to use less electricity at home and prevent greenhouse gas emissions that lead to global climate change. Lighting accounts for close to 20 percent of the average home's electric bill. ENERGY STAR qualified CFLs use up to 75 percent less energy (electricity) than incandescent light bulbs, last up to 10 times longer, cost little up front, and provide a quick return on investment.

If every home in America replaced just one incandescent light bulb with an ENERGY STAR qualified CFL, in one year it would save enough energy to light more than 3 million homes. That would prevent the release of greenhouse gas equal to that of 750,000 cars.

EPA estimates that the U.S. is responsible for the release of approximately 104 metric tons of mercury emissions each year. Most of these emissions come from coal-fired electrical power plants. Mercury released into the air is the main way that mercury gets into water and bio-accumulates in fish. (Eating fish contaminated with mercury is the main way for humans to be exposed.)

Most mercury vapor inside fluorescent light bulbs becomes bound to the inside of the light bulb as it is used. EPA estimates that the rest of the mercury within a CFL—about 11 percent—is released into the air or water when it is sent to a landfill, assuming the light bulb is broken. Therefore, if all 290 million CFLs sold in 2007 were sent to a landfill (versus recycled, as a worst case)—they would add 0.13 metric tons, or 0.1 percent, to U.S. mercury emissions.

Electricity use is the main source of mercury emissions in the U.S. CFLs use less electricity than incandescent lights, meaning CFLs reduce the amount of mercury into the environment. As shown in the table below, a 13-watt, 8,000-rated-hour-life CFL (60-watt equivalent; a common light bulb type) will save 376 kWh over its lifetime, thus avoiding 4.5 mg of mercury. If the bulb goes to a landfill, overall emissions savings would drop a little, to 4.1 mg. EPA recommends that CFLs are recycled where possible, to maximize mercury savings.

OSW is working to expand available CFL recycling options across the country. Specifically, OSW is working with major U.S. retailers and lamp manufacturers and local communities, and encourages others to join in to increase these recycling opportunities to make it easier and more convenient for all Americans to recycle their CFLs. Consumers can contact their local municipal solid waste agency directly, or go to www.epa.gov/bulbrecycling or www.earth911.org to identify existing local recycling options. To support this effort, OSW is:

- Coordinating with major lamp manufacturers (e.g., Osram, Sylvania, Philips), retailers (e.g., Wal-Mart), and NGOs (e.g., Electrical Manufacturers Association (NEMA), Association of Lamp Manufacturers and Recyclers (ALMR)) to reduce the amount of mercury in lamps (5 mg mercury per 25 watt or less in lamps) and to establish a cost-effective and efficient national infrastructure for lamp collection and recycling.
- Investigating the feasibility of developing a cost-effective and convenient national approach to lamp collection, coordinating with the U.S. Postal Service (USPS), using a USPS-developed mailer, and utilizing the USPS delivery system to promote lamp recycling.
- Collaborating with the Environmental Council of States (ECOS) Quicksilver Caucus to enhance lamp collection and recycling at the state level.
- Participating in the Product Stewardship Institute (PSI) National Fluorescent Lamp Dialogue to establish national lamp collection and recycling options. For more information on the options please visit www.productstewardship.us or <http://productstewardship.us/displaycommon.cfm?an=1&subarticlenbr=271>.

Dental Amalgam Waste Recycling Outreach Effort: Environmentally Responsible Dentistry

The use of dental amalgam in dentistry is widespread throughout the country, although its use is declining. The latest Agency data shows that US dentists placed 66 million amalgam restorations in 1999, and that nearly 100,000 dentists place and/or remove amalgam restorations in the US. Dental amalgam placements account for 14 percent of the mercury in use in the U.S. (34 metric tons of the 245 metric tons used nationwide). Dental amalgam contains 50 percent by weight mercury. When dental amalgam is released to the water, this mercury fraction has the potential of being transformed by microbial action into methyl mercury. EPA is most concerned about methyl mercury in the environment as it is a more potent and a more bioaccumulative form of mercury. To deal with this on-going problem, many states have already mandated the use of specific technologies to control the amount of amalgam reaching the environment from the dental office. EPA is in the process of developing voluntary partnerships with various entities in the dental industry to promote the recycling of amalgam, both from an environmental stewardship perspective, as well as outreach. Specifically, OSW has partnered with the Marquette School of Dentistry and has completed a curriculum based module on dental amalgam recycling entitled "Dental Amalgam Recycling: Pathways, Principles, & Practice." This module has been designed to make student dentists more aware of the importance of recycling (and the impact of not recycling) amalgam waste generated in their office once they begin their practice. Once this has been peer reviewed during the summer of 2008, EPA plans to distribute this module to other dental schools in the US and Canada for use in their schools. EPA also plans to work with the American Dental Association (ADA) to develop a short course from this student module for professionals returning for continuing education credits once this student version is complete. EPA is also working with dental amalgam manufacturers to develop product marketing information which will assist the dentist on how to properly manage any wastes generated from the use of the amalgam product.

International and Artisanal Gold Mining

OSW has provided technical assistance to the Global Environmental Fund (GEF) project for the last five years on the management of mercury in artisanal gold mining. The GEF/United Nations Industrial Development Organization (UNIDO) program involves the environmental monitoring of human health and the environment in six countries, as well as the introduction of alternative mining methods to reduce or eliminate the use of mercury in gold mining. OSW is currently participating in an effort to provide additional technical support to this program.

International Mercury Reduction in Mining

OSW has provided technical assistance to other Mercury Mining activities that are not GEF-related. One activity is the Amazon Basin Commission which is related to the reduction in the use of mercury in artisanal gold mining in the Amazon. Over the last two years, we have provided technical support to the Commission regarding the scope of mercury use and evaluation of alternative gold recovery methods. These activities are a part of the United Nations Environmental Program (UNEP), collaboration by various parts of the Agency to provide technical assistance to those countries not participating in GEF.

Thermostat Recycling Corporation/Product Stewardship Institute Incentive Pilot

In 2005, OSW partially funded (by grant to the Product Stewardship Institute—PSI) a thermostat recycling incentive pilot project. This pilot project involves a coordinated effort among industry, States (Indiana and Oregon), EPA, the Thermostat Recycling Corporation (TRC), and PSI, to offer a rebate to contractors who replace and recycle old mercury-containing thermostats with new Energy Star thermostats in Indiana and Oregon. The pilot project began in January 2006 and was implemented to determine whether or not a rebate enhances the recycling rate of mercury-containing thermostats. Results of the pilot were mixed, with greater participation in Oregon than in Indiana, due in part to changing priorities. For more information, please visit our website at http://www.productstewardship.us/associations/6596/files/Final_Report-Thermostat_Incentive_Pilot_OR_IN_11-12-07.doc.

In 2006, building on the previous work addressing the management of mercury thermostats, OSW partially funded (by grant to the Product Stewardship Institute—PSI) a homeowner incentive and mail-back program and a comprehensive thermostat management program. Work on these efforts had been on hold; however, industry partners have recently resolved all outstanding issues that had stalled progress and have committed to complete the project. For more information regarding thermostat collection and recycling, please visit: <http://www.productstewardship.us/displaycommon.cfm?an=1&subarticlenbr=97>.